

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 July 2004 (29.07.2004)

PCT

(10) International Publication Number
WO 2004/064048 A2

(51) International Patent Classification⁷: **G11B 5/64**

(21) International Application Number:
PCT/JP2004/000205

(22) International Filing Date: 14 January 2004 (14.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2003-6188 14 January 2003 (14.01.2003) JP
2003-6189 14 January 2003 (14.01.2003) JP
60/440,631 17 January 2003 (17.01.2003) US
2003-103452 7 April 2003 (07.04.2003) JP
2003-103453 7 April 2003 (07.04.2003) JP

(71) Applicants (for all designated States except US): **SHOWA DENKO K.K.** [JP/JP]; 13-9, Shibadaimon 1-chome, Minato-ku, Tokyo 105-8518 (JP). **KABUSHIKI KAISHA TOSHIBA** [JP/JP]; 1-1-1, Shibaura, Minato-ku, Tokyo 105-8001 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHIMIZU, Kenji** [JP/JP]; Showa Denko HD K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba 290-0067 (JP). **SAKAWAKI, Akira** [JP/JP]; Showa Denko HD K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba 290-0067 (JP). **KOBAYASHI, Kazuo** [JP/JP]; Showa Denko HD K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba 290-0067 (JP). **NGUYEN, Tien, Duong** [JP/JP]; Showa Denko HD K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba 290-0067 (JP).

SAKAI, Hiroshi [JP/JP]; Showa Denko HD K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba 290-0067 (JP). **HIKOSAKA, Takashi** [JP/JP]; Kabushiki Kaisha Toshiba, Ome Complex, 2-9, Suehiro-cho, Ome-shi, Tokyo 143-0025 (JP). **OIKAWA, Solchi** [JP/JP]; Kabushiki Kaisha Toshiba, Ome Complex, 2-9, Suehiro-cho, Ome-shi, Tokyo 143-0025 (JP). **MAEDA, Tomoyuki** [JP/JP]; Kabushiki Kaisha Toshiba, Ome Complex, 2-9, Suehiro-cho, Ome-shi, Tokyo 143-0025 (JP). **NAKA-MURA, Futoshi** [JP/JP]; Kabushiki Kaisha Toshiba, Ome Complex, 2-9, Suehiro-cho, Ome-shi, Tokyo 143-0025 (JP).

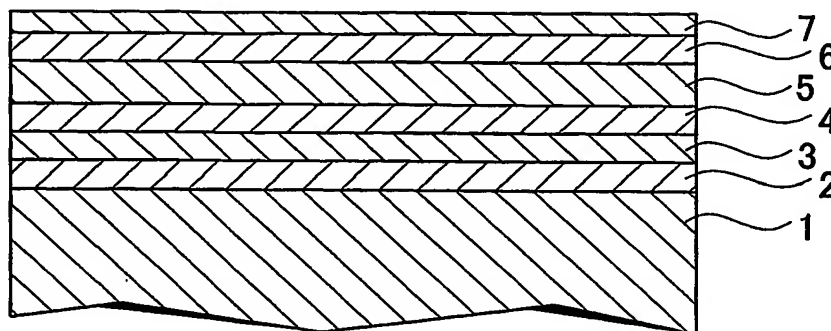
(74) Agents: **SHIGA, Masatake et al.**; 2-3-1 Yaesu, Chuo-ku, Tokyo 104-8453 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: **MAGNETIC RECORDING MEDIUM, METHOD OF MANUFACTURING THEREFOR, AND MAGNETIC READ/WRITE APPARATUS**



(57) Abstract: A soft magnetic undercoat film, a first undercoat film, a second undercoat film, a perpendicular magnetic recording film, and a protective film are provided on a non-magnetic substrate, and the first undercoat film consists of Pt, Pd, or an alloy including at least one among these, and the second undercoat film consists of Ru or an Ru alloy.



Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.